

10/537817

11/PRTS

JC17 Rec'd PCT/PTO 07 JUN 2005

DESCRIPTION

JACK-IN-A-BOX

Technical Field

The present invention relates to a game device.

Background Art

There has been known a game device in which a plurality of insertion holes are provided in an outer wall portion of a case and insertion members are inserted one by one into each of the holes, and when an insertion member is inserted into a particular insertion hole that is a hit insertion hole, spring force is applied to a jump-out member placed in a fixed position of the case to cause the jump-out member to jump out in a jumping-out direction (for example, see JP-Jitsukaihei-4-5892-U).

According to the above jack-in-a-box, to change the particular insertion hole, i.e. the hit insertion hole, the jump-out member placed in the fixed position of the case is rotated.

Moreover, according to the jack-in-a-box, in order to place the jump-out member in the fixed position of the case, the jump-out member is locked while resisting to spring force, and the lock is released by being hit by an

insertion member inserted into the particular insertion hole, the hit insertion hole.

However, with respect to the above jack-in-a-box, to change the particular insertion hole, i.e. the hit insertion hole, the jump-out member placed in the fixed position in the case is rotated. Therefore, after the particular insertion hole is changed, based on the rotated amount of the jump-out member, it has been possible to guess to a certain extent which hole is to be the particular insertion hole, the hit insertion hole.

Further, since the lock is released by being hit by an insertion member inserted into the particular insertion hole, i.e. the hit insertion hole, the jump-out member jumps out as soon as the insertion member is inserted into the particular insertion hole, the hit insertion hole. As a result, it has not been possible to enjoy the afterglow or enjoy feeling of tension after the insertion member is inserted into the particular insertion hole, the hit insertion hole.

Disclosure of the Invention

The present invention has been made in view of the above points, and an object thereof is to provide a jack-in-a-box whose operation is difficult to guess, and with which it is possible to enjoy afterglow as well as feeling of tension.

According to a first aspect of the present invention, a jack-in-a-box of the present invention comprises: a case provided with a plurality of insertion holes in an outer wall portion thereof; a jump-out member placed in a fixed position of the case; a plurality of insertion members to be inserted into each of the plurality of insertion holes; a jump-out-force applying device to apply spring force to the jump-out member in a jumping-out direction; a locking device capable of locking the jump-out member while resisting the spring force of the jump-out-force applying device and keeping the jump-out member in the fixed position of the case; a releasing device to release lock of the locking device; a detection device to detect insertion of the plurality of insertion members; an action generating device to perform a predetermined action; and a control device to set the number of insertion required until the jump-out member jumps out, cause the action generating device to perform the predetermined action when the number of insertion of the insertion members detected by the detection device has reached the set number, and then cause the releasing device to operate.

According to the jack-in-a-box, since the number of insertion required until the jump-out member jumps out is

automatically set by the control device, it is impossible to guess when the jump-out member jumps out.

Moreover, since the jump-out member performs an action immediately before the jump-out member jumps out, it is possible to enjoy the afterglow of "hit" or "miss" as well as feeling of tension.

Preferably, in the jack-in-a-box, the number of insertion required until the jump-out member jumps out is set for each game. For example, "start of a game" is set by turning on a power supply switch or resetting through a reset switch.

According to the jack-in-a-box, the number of insertion required until the jump-out member jumps out is set for each game. Therefore, when the set number is equal to or less than the number of insertion members to be inserted in one game, the jump-out member definitely jumps out in the game. When the set number is more than the number of insertion members to be inserted in one game, the jump-out member does not jump out in the game. Accordingly, as compared with a case where the jump-out member definitely jumps out in one game, it is possible to enjoy a game with more varieties.

Preferably, in the jack-in-a-box, the number of insertion required until the jump-out member jumps out is equal to or less than the number of the insertion holes.

According to the jack-in-a-box, the number of insertion required until the jump-out member jumps out is equal to or less than the number of the insertion holes. Therefore, the jump-out member definitely jumps out by the time when the number of inserted insertion members reaches the number of the insertion holes. Accordingly, it is effective when it is desired to distinguish one player of the game from the other player(s) by using different colors.

Preferably, in the jack-in-a-box, any one of light emitting operation, sound producing operation and vibration operation is contained as the predetermined action.

According to the jack-in-a-box, any one of light emitting operation, sound producing operation and vibration operation is contained as the predetermined action. Therefore, an interesting jack-in-a-box can be realized.

Preferably, in the jack-in-a-box, another action which is distinguishable from the predetermined action is sometimes performed before the number of insertion of the

insertion members reaches the set number. The "action which is distinguishable" is, for example, an action where a light-emitting state, sound, music or vibration state is different from that of the predetermined action. "Sometimes performed" means that the another action may not be performed in some games.

According to the jack-in-a-box, it is possible to distinguish the case where the jump-out member jumps out from the case where the jump-out member does not jump out, based on the action.

Brief Description of the Drawings

FIG. 1 is a perspective view of a jack-in-a-box according to an embodiment of the present invention.

FIG. 2 is an exploded perspective view of the jack-in-a-box according to the embodiment of the present invention.

FIG. 3 is a perspective view of a jump-out member and a jump-out-force applying device of the jack-in-a-box according to the embodiment of the present invention.

FIG. 4 is a vertical sectional side view of the jump-out-force applying device of the jack-in-a-box according to the embodiment of the present invention.

FIG. 5 is a plane sectional view showing operation of a detection device of the jack-in-a-box according to the embodiment of the present invention.

FIGS. 6A and 6B are structural views of a releasing device of the jack-in-a-box according to the embodiment of the present invention.

FIGS. 7A and 7B are structural views of a vibration device of the jack-in-a-box according to the embodiment of the present invention.

FIG. 8 is a block diagram of an internal circuit of the jack-in-a-box according to the embodiment of the present invention.

FIG. 9 is a flowchart regarding operation of a control device of the jack-in-a-box according to the embodiment of the present invention.

FIG. 10 is a table showing a list of hit actions of the jack-in-a-box according to the embodiment of the present invention.

FIG. 11 is a table showing a list of miss actions of the jack-in-a-box according to the embodiment of the present invention.

Best Mode for Carrying Out the Invention

1. Entire Structure

FIG. 1 is a perspective view of an entire jack-in-a-box according to the present invention.

As shown in the drawing, a jack-in-a-box 1 includes a case 2 which has a barrel-like appearance and is provided with a plurality of insertion holes 2b in an outer wall portion 2a, insertion members 3 to be inserted into the insertion holes 2b, and a jump-out member 4. Inside the jack-in-a-box 1, provided are: a jump-out-force applying device 5 (FIG. 2) which applies spring force to cause the jump-out member 4 to jump out; a locking device 6 capable of locking the jump-out member 4 while resisting the spring force of the jump-out-force applying device 5 and keeping the jump-out member 4 in a fixed position of the case 2; a releasing device 8 (FIGS. 6A and 6B) to release lock of the locking device 6; a detection device 9 to detect insertion of the insertion members 3; a sound producing device 10 to generate sound when the insertion members 3 are inserted; a vibration device 11 to vibrate the case 2 when the insertion members 3 are inserted; and a control device 12 to control operation of the releasing device 8, sound producing device 10, and vibration device 11. The control device 12 automatically sets how many of the insertion members 3 are to be inserted until reaching a hit mode, and controls operation of the releasing device 8, vibration device 11, and sound producing device 10 in accordance with the number of inserted insertion members 3, which number being detected by the detection device 9.

2. Entire Operation

When the insertion members 3 are inserted into the insertion holes 2b one by one, the sound producing device 10 and the vibration device 11 are operated in accordance with the number of inserted insertion members 3, which number being detected by the detection device 9, and the jack-in-a-box 1 performs various actions. In the end, the releasing device 8 is operated, and the jump-out member 4 is caused to jump out by the jump-out-force applying device 5.

2. Detail Structure

(1) A detail structure of the jack-in-a-box according to the present invention will be explained based on FIG. 2 and drawings following thereto.

FIG. 2 is an exploded perspective view of the jack-in-a-box 1, FIG. 3 is a perspective view of the jump-out member 4 and jump-out-force applying device 5, FIG. 4 is a vertical sectional side view of the jump-out-force applying device 5, FIG. 5 is a plane sectional view of the jack-in-a-box 1 showing operation of the detection device 9, and FIGS. 6A and 6B are structural views of the releasing device 8.

(2) Case 2

The case 2 includes, for example, an upper case 13 and a lower case 14 which can be separated from each other. The case 2 is formed into a hollow-centered case

having a barrel-like appearance. In the outer wall portion 2a of the case 2, provided are the plurality of insertion holes 2b into which the insertion members 3 are to be inserted. Further, in a top plate of the upper case 13, an opening portion 15 for placing the jump-out member 4 thereinto is provided, and, at the bottom of the lower case 14, a sound releasing hole (now shown) for releasing sound generated by the sound producing device 10 is provided.

(3) Jump-Out Member 4

The jump-out member 4 has an external appearance like a doll.

(4) Jump-Out-Force Applying Device 5

The jump-out-force applying device 5 applies jump-out force to the jump-out member 4. The jump-out-force applying device 5 includes a cylindrical body 16 and a rod 17 accommodated in the cylindrical body 16 so as to be movable upward and downward, as shown in FIGS. 3 and 4. An upper end portion of the cylindrical body 16 is supported on a receiving portion (not shown) provided in a central portion of the upper case 13, and a lower end portion thereof is fixedly supported on a receiving portion 18 provided in a central portion of the lower case 14. A spring 19 to apply ascending force to the rod 17 is accommodated in the cylindrical body 16. On an outer circumferential portion of the cylindrical body 16,

provided is the locking device 6 capable of locking the rod 17 in a descended state while resisting the spring force of the spring 19.

(5) Locking Device 6

The locking device 6 includes a locking lever 20. The locking lever 20 is attached on the outer circumferential portion of the cylindrical body 16, and operated around a shaft 21. A pawl 22 formed at a lower end of the locking lever 20 intrudes into the cylindrical body 16 and can be held at an upper end of a flange 23 provided at a lower end of the rod 17. Further, the locking lever 20 is configured such that the pawl 22 formed at the lower end thereof is biased toward the inside of the cylindrical body 16 by a spring 24.

The lower side of the flange 23 is tapered, and, when the rod 17 is moved downward, the tapered portion is brought into contact with the pawl 22 and serves to cause the pawl 22 to move toward the outside of the cylindrical body 16 while resisting the biasing force of the spring 19.

(6) Releasing Device 8

The releasing device 8 includes a motor 25, a gear 27 to engage with a motor gear 26, a gear 28 provided coaxially with the gear 27, another gear 29 to engage with the gear 28, and a rotary body 31 (cam) which is provided coaxially with the gear 29 and to which an

eccentric pin 30 is attached. A spring 32 for bringing the gear 27 back to an initial position is attached to the gear 27.

The releasing device 8 transmits power of the motor 25 to the rotary body 31 through the gears 26 to 29, and the locking lever 20 is operated through the eccentric pin 30 (see FIG. 4).

(7) Detection Device 9

The detection device 9 includes a ring member 33 and a detection switch 34, as shown in FIG. 5.

The ring member 33 is placed on rotary guide portions 35 provided on upper portions of the inside of the lower case 14. Contact-operation pieces 36 are provided integrally with the ring member 33 on the upper and lower sides of the ring member 33 such that the contact-operation pieces 36 are in positions corresponding to the insertion holes 2b of the case 2.

Wedge-shaped portions (cams) 36a of the contact-operation pieces 36 apply torque to the ring member 33 upon reception of contact force from an insertion member 3 inserted into an arbitrary insertion hole 2b of the case 2.

With respect to the ring member 33, the cams 36a of the contact-operation pieces 36 are ordinarily placed on the inner side of the insertion holes 2b of the case 2 due to a return spring 37. When an insertion member 3

inserted from an insertion hole 2b of the case 2 is brought into contact with a cam 36a, the ring member 33 is rotated by a predetermined angle clockwise when viewed from the above. The ring member 33 returns to the initial position through an opening portion 38 of the insertion member 3. That is, the ring member 33 performs one reciprocal rotation each time an insertion member 3 is inserted.

The detection switch 34 is provided on the ring member 33. The detection switch 34 is a normal open switch, and switch pieces 34a and 34b forming a pair are placed inside a C-shaped portion 39 formed on the lower case 14. As a result, the detection switch 34 is temporarily turned on every time the ring member 33 performs reciprocal rotation operation.

(8) Sound Producing Device 10 (Action Generating Device)

The sound producing device 10 includes a D/A conversion unit to convert sound data stored in a storage device 40 into an analog signal, an amplification unit to amplify the analog signal, and a speaker.

(9) Vibration Device 11 (Action Generating Device)

The vibration device 11 includes a motor 41, a gear 43 to engage with a motor gear 42, a gear 44 provided coaxially with the gear 43, a gear 45 to engage with the gear 44, a gear 46 provided coaxially with the gear 45, a

gear 47 to engage with the gear 46, a rotary body 49 (cam) which is provided coaxially with the gear 47 and to which an eccentric pin 48 is attached, and a swing body 52 which engages with the eccentric pin 48 through a long hole 50 and swings around a shaft 51, as shown in FIGS. 7A and 7B.

The vibration device 11 transmits power of the motor 41 to the rotary body 49 through the gears 42 to 47, and the swing body 52 is swung through the eccentric pin 48.

(10) Control Device 12

The control device 12 controls the releasing device 8, sound producing device 10 and vibration device 11 in accordance with a game program stored in the storage device 40, as shown in the block diagram in FIG. 8.

Next, operation of the control device 12 performed in accordance with operation of inserting the insertion members 3 will be described with reference to the flowchart in FIG. 9. As shown in the drawing, when insertion of an insertion member 3 into an insertion hole 2b is detected by the detection device 9 (Step S10: YES) and the insertion member 3 is the first inserted insertion member (Step S12: YES), the control device 12 generates a random number within the range of the number of the insertion holes 2b ("1" to "24") provided in the jack-in-a-box 1 (Step S14). The control device 12 judges as "hit" when the number of inserted insertion members 3

reaches the number corresponding to the hit random number (Step S16: YES). When the control device 12 has judged that the insertion operation is "hit", a hit action is caused based on action patterns of hit actions stored in the storage device 40 beforehand (Step S18).

A list of the hit actions is shown in FIG. 10. For each kind of the hit actions, there are set an action pattern containing sound effect data unique thereto and a probability of occurrence of the hit action. Moreover, for each action pattern, defined is a combination of, for example, operation of producing sound of sound effect using the sound producing device 10, operation of vibrating the jack-in-a-box 1 using the vibration device 11, and a timing of jump-out operation of the jump-out member 4. The hit actions are classified into normal hit and reach hit, as shown in FIG. 10. When the normal hit is selected, there is caused a hit action where, after the jump-out member 4 has jumped out with jumping-out sound, sound producing operation using sound effect and vibration operation are performed. When the reach hit is selected, there is caused a hit action where sound producing operation using sound effect and vibration operation are performed, and then the jump-out member 4 jumps out with jumping-out sound.

The control device 12 selects a hit action from the list of the hit actions based on the probability of

occurrence, when insertion operation is judged as "hit". More concretely, for example, a kind of hit action is assigned beforehand to numeric values "1" to "100" based on the probability of occurrence of each kind of hit actions. The control device 12 generates a random number within the range of "1" to "100" when insertion operation has been judged as "hit", and determines a hit action to be caused. The control device 12 causes the hit action by controlling the sound producing device 10, vibration device 11, jump-out-force applying device 5 and the like in accordance with the corresponding action pattern.

The hit actions contain advanced reach hit actions (for example, "advanced reach hit C" and "advanced reach hit D" of the kinds of the hit actions as shown in FIG. 11). When an advanced reach hit action has been caused, the game is proceeded in such an exceptional manner that the same person continuously inserts another insertion member 3. In this case, the jack-in-a-box 1 is operated such that the jump-out member 4 jumps out in accordance with insertion operation of the another insertion member 3.

Moreover, the control device 12 judges as "miss" when the number of inserted insertion members 3 is below the hit random number (Step S16: NO). When the control device 12 has judged that insertion operation is "miss", a miss action is caused based on the action patterns of

the miss actions stored in the storage device 40 (Step S20), and then the process is returned to Step S10 to repeat the processing.

A list of the miss actions is shown in FIG. 11. For each kind of the miss actions, there are set an action pattern containing sound effect data unique thereto and a probability of occurrence of the miss action. Moreover, for each action pattern, defined is a combination of, for example, operation of producing sound of sound effect using the sound producing device 10, and operation of vibrating the jack-in-a-box 1 using the vibration device 11. For example, for "reach miss C" of the kinds of the miss actions, an action pattern containing sound effect data unique thereto and a probability of occurrence "5(%)" are set.

The control device 12 selects a miss action from the list of the miss actions based on the probability of occurrence, when insertion operation is judged as "miss". More concretely, as in the same manner of selecting a hit action, for example, a miss action to be caused is determined by using a random number. The control device 12 causes a miss action by controlling the sound producing device 10, vibration device 11 and the like in accordance with the corresponding action pattern.

Moreover, as in the case of the hit actions, the miss actions contain advanced reach miss actions (for

example, "advanced reach miss A" and "advanced reach miss B" of the kinds of the miss actions as shown in FIG. 11). Also when an advanced reach miss action has been caused, the game is proceeded in such an exceptional manner that the same person continuously inserts another insertion member 3. When an advanced reach miss action is has been caused, the insertion operation of the continuously inserted another insertion member is processed as "miss".

For example, when the hit random number is "10", the control device 12 judges as "hit" at the time when the tenth insertion member 3 is inserted. When an advanced reach miss action is caused in accordance with any one of nine times of insertion operation, the continuously inserted another insertion member 3 is not taken into consideration. That is, when an advanced reach miss action is caused once in accordance with any one of nine times of insertion operation, the control device 12 judges as "hit" in accordance with operation of inserting an eleventh insertion member 3.

Moreover, when the generated hit random number is "24", the control device 12 performs control such that an advanced hit action (for example, "advanced reach hit C" and "advanced reach hit D" of the kinds of hit actions as shown in FIG. 10) is not caused. More concretely, when the hit action selected based on the random number is an advanced reach hit action, the control device 12

generates a random number again and selects a hit action again.

(11) Others

Although not particularly limited, a battery is used as a power source. The battery is detachably accommodated in the case 2. A knob of a power supply switch may be specially provided on the case 2; however, the power supply switch may be turned on when the rod 17 is moved downward.

4. Modifications of the Invention

Hereinabove, an embodiment of the present invention has been described. The present invention, however, is not limited to the above embodiment. It goes without saying that various modifications can be made without departing from spirit and scope of the invention.

Industrial Applicability

To describe advantageous effect of the representative embodiment of the present invention, a jack-in-a-box comprises: a case provided with a plurality of insertion holes in an outer wall portion thereof; a jump-out member placed in a fixed position of the case; a plurality of insertion members to be inserted into each of the plurality of insertion holes; a jump-out-force applying device to apply spring force to the jump-out member in a jumping-out direction; a locking device

capable of locking the jump-out member while resisting the spring force of the jump-out-force applying device and keeping the jump-out member in the fixed position of the case; a releasing device to release lock of the locking device; a detection device to detect insertion of the plurality of insertion members; an action generating device to perform a predetermined action; and a control device to set the number of insertion required until the jump-out member jumps out, cause the action generating device to perform the predetermined action when the number of insertion of the insertion members detected by the detection device has reached the set number, and then cause the releasing device to operate; therefore, there is realized a jack-in-a-box whose operation is difficult to guess, and with which it is possible to enjoy afterglow as well as feeling of tension.